

### **ABSTRACT OF THE DISCLOSURE**

The add path of a dense wavelength division multiplexing (DWDM) add/drop node comprises an  $n:1$  coupler for combining  $n$  signal sources. The combined signal is amplified and then demultiplexed. Each output of the demultiplexer is passed through a variable optical attenuator (VOA) and the VOA outputs multiplexed to form the add signal. Channels carrying no add signal and not used to control the added signals are attenuated to zero to remove a broadband noise contribution from those channels. The signal sources are run at maximum power and the signals of those channels are attenuated by the respective VOAs to control their amplitude and optimize the optical signal to noise ratio of the add signal.